Stewarding Respiratory Tract Infections

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February 6, 2018

This presentation is intended for educational use only, and does not in any way constitute medical consultation or advice related to any specific patient.
What duration of therapy is appropriate for treating community acquired pneumonia?

- 3-5 days
- 5-7 days
- 7-10 days
- 10-14 days
What drives duration of therapy? History, the Solar System, and a Human hand

-Babylonians held the number 7 in mystical significance

-Ancient Chinese and Japanese based 7-day cycles on celestial bodies (Sun, Moon, Mars, Mercury, Jupiter, Venus and Saturn)

-Judaism, the world was created in 7 days

AD 321: 7-day week is formally codified by the Romans
Symptom-guided duration

Adult hospitalized patients with CAP

Day 5
- CONTROL (N = 150)
  [MD-guided duration]

INTERVENTION (N = 162)
  [Symptom-guided duration]

Day 10
- Clinical Success 48.6%

Day 30
- Clinical Success 88.9%

INTERVENTION, antibiotics stopped if:
Afebrile x48h AND ≤1 CAP-associated sign of clinical instability:
  [SBP < 90 | HR > 100 | RR>24 | O2 Sat < 90% | PaO2 < 60 on RA]

JAMA Intern Med. 2016 Sep 1;176(9):1257-65.
Symptom-guided duration, some caveats

- 30% of subjects in the intervention received >5 days of antibiotic therapy

- Excluded patients living in a nursing home or prior hospital stay within 14 days prior to admit

- Excluded immunosuppressed patients

- No differences in LOS or length or days of IV antibiotic

- 80% of antibiotics selected were fluoroquinolones

JAMA Intern Med. 2016 Sep 1;176(9):1257-65.
Sticky Notes to Physicians

MD, IV fluids order was for 1 liter which is complete. Would you like to d/c the order now? Thank you, nursing.

2/1- Dr. Yuan, suggest d/c antibiotics after tomorrow’s dose (2/2). Will have completed 5 days of abx which is non-inferior to longer duration for mild-moderate CAP. JAMA Int Med. 2016 Sep; 176(9): 1257-65. Thank you- Kevin S, PharmD x5636

Last edited by Kevin Stock, PharmD on 02/01/18 at 1206
3-step pathway to reduce duration of antibiotics and length of stay in patients with CAP

- **Early Mobilization**
  - During 1\(^{st}\) 24h of hospitalization

- **IV to PO Antibiotic**
  - Clinically improved, vital signs stable, tolerate oral

- **Predefined criteria for hospital discharge**
  - Baseline mental status & adequate oxygenation on room air

<table>
<thead>
<tr>
<th>Event</th>
<th>3-Step Critical Pathway Group (n = 200)</th>
<th>Usual Care Group (n = 201)</th>
<th>Difference (95% CI)(^a)</th>
<th>P Value(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary end point: LOS, median (IQR), d</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Overall</td>
<td>3.9 (2.79 to 5.75)</td>
<td>6.0 (4.75 to 8.83)</td>
<td>-2.1 (-2.7 to -1.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>IDIBELL—Hospital Universitari de Bellvitge</td>
<td>4.0 (2.83 to 5.75)</td>
<td>6.0 (4.62 to 8.88)</td>
<td>-2.0 (-2.7 to -1.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>SCIAS—Hospital de Barcelona</td>
<td>3.7 (2.71 to 5.67)</td>
<td>6.3 (4.87 to 8.71)</td>
<td>-2.6 (-3.2 to -1.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Secondary end points</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of intravenous antibiotic therapy, median (IQR), d</td>
<td>2.0 (2.0 to 3.0)</td>
<td>4.0 (2.0 to 6.0)</td>
<td>-2.0 (-2.0 to -1.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Adverse drug reactions, No. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phlebitis</td>
<td>9 (4.5)</td>
<td>32 (15.9)</td>
<td>-11.4 (-17.2 to -5.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Skin eruption</td>
<td>8 (4.0)</td>
<td>21 (10.4)</td>
<td>-6.4 (-11.5 to -1.4)</td>
<td>.02</td>
</tr>
<tr>
<td>Vomiting/diarrhea</td>
<td>0</td>
<td>2 (1.0)</td>
<td>-1.0 (-2.4 to 0.4)</td>
<td>.50</td>
</tr>
<tr>
<td>Allergy</td>
<td>1 (0.5)</td>
<td>1 (0.5)</td>
<td>0 (-1.4 to 1.4)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Transaminitis</td>
<td>0</td>
<td>3 (1.5)</td>
<td>-1.5 (-3.2 to 0.2)</td>
<td>.25</td>
</tr>
<tr>
<td>Medical complications, No. (%)</td>
<td>40 (20.0)</td>
<td>49 (24.4)</td>
<td>-4.4 (-12.6 to 3.8)</td>
<td>.34</td>
</tr>
<tr>
<td>Empyema</td>
<td>3 (1.5)</td>
<td>6 (3.0)</td>
<td>-1.5 (-4.4 to 1.4)</td>
<td>.50</td>
</tr>
<tr>
<td>Cardiac complication(^c)</td>
<td>8 (4.0)</td>
<td>16 (8.0)</td>
<td>-8.0 (-8.6 to 0.7)</td>
<td>.14</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>15 (7.5)</td>
<td>8 (4.0)</td>
<td>3.5 (-1.0 to 8.1)</td>
<td>.14</td>
</tr>
<tr>
<td>Acute confusion</td>
<td>7 (3.5)</td>
<td>8 (4.0)</td>
<td>-0.5 (-4.2 to 3.2)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Renal failure</td>
<td>7 (3.5)</td>
<td>8 (4.0)</td>
<td>-0.5 (-4.2 to 3.2)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Nosocomial infection</td>
<td>2 (1.0)</td>
<td>3 (1.5)</td>
<td>-0.5 (-2.7 to 1.7)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Severe hyperglycemia</td>
<td>3 (1.5)</td>
<td>9 (4.5)</td>
<td>-3.0 (-6.3 to 0.3)</td>
<td>.14</td>
</tr>
<tr>
<td>Shock</td>
<td>2 (1.0)</td>
<td>3 (1.5)</td>
<td>-0.5 (-2.7 to 1.7)</td>
<td>&gt;.99</td>
</tr>
<tr>
<td>Subsequent hospital admission (&lt;30 d), No. (%)(^d)</td>
<td>18 (9.1)</td>
<td>15 (7.5)</td>
<td>1.6 (-3.8 to 7.1)</td>
<td>.59</td>
</tr>
<tr>
<td>Overall case-fatality rate (&lt;30 d), No. (%)</td>
<td>4 (2.0)</td>
<td>2 (1.0)</td>
<td>1.0 (-1.4 to 3.4)</td>
<td>.45</td>
</tr>
</tbody>
</table>
Imagine if, for the cost of a single sheet of paper and the effort required to place it in the patient’s medical chart, you could reduce length of stay by 2 days and save up to $4600 per patient yet have no impact on readmission rate. One might think a deal with the devil had been struck....”

ANTIMICROBIAL AGENTS

Benefits of Oral Therapy
- Equally as effective as IV
- Shortened length of stay
- Fewer bloodstream infections
- Reduction in administration and preparation time
- Decreased drug cost

Which Infections?
- Respiratory tract infections
- Urinary tract infections including pyelonephritis
- Skin and soft tissue infections
- Intra-abdominal infections

How to transition?
Transitioning the same drug is easy:
  - e.g. Levofloxacin IV → Levofloxacin PO
  - Exception: Clindamycin 600 mg IV → 300 mg PO
Other options:
  - Piperacillin/Tazobactam (Zosyn)
  - Ciprofloxacin + Clindamycin
  - Ciprofloxacin + Amoxicillin/Clavulanate
  - Levofloxacin + Metronidazole

When to Transition?
- Functional GI tract
- Stable vital signs
- WBC normalizing

Call the Antimicrobial Stewardship Program Hotline with questions about transitions to oral therapy at x7-7567

Let’s Go PO
Transitional Antimicrobial Therapy

UCLA Antimicrobial Stewardship Program, Education materials.
MRSA nasal swabs:
*If it doesn’t grow, just say no*

- Retrospective study x2 years, 6 ICUs in a single center

12,215 adult ICU pts w/ MRSA surveillance swabs

MRSA-positive nasal swab
N = 441 (3.7%)
403 on admit

MRSA-negative nasal swab
N = 11,441 (96.3%)

MRSA-negative culture
N = 342 (77.6%)
- Received empiric vancomycin
  N = 102 (29.8%)

MRSA-positive culture
N = 99 (22.4%)
- Treated for MRSA infection
  N = 65 (14.7%)

MRSA-negative culture
N = 11,392 (99.6%)
- Received empiric vancomycin
  N = 4,067 (35.7%)

MRSA-positive culture
N = 49 (0.4%)
- Treated for MRSA infection
  N = 25 (0.22%)

Infect Control Hosp Epidemiol 2018;1-7

**STEWARDSHIP OPPORTUNITY**
What duration of therapy is appropriate for treating community acquired pneumonia?

- 3-5 days

BUT....
Patient-specific factors may justify longer treatment durations

- 5-7 days
- 7-10 days
- 10-14 days
Many signs and symptoms of bacterial infections result from the inflammatory response to the bacteria rather than the direct presence of viable bacteria. The persistence of symptoms for a few days does not necessarily mean that viable bacteria are still present.

- Brad Spellberg, MD

The maturing antibiotic mantra: Shorter is STILL Better
My institution has procalcitonin testing

- Yes
- No. Considering getting it in the near future
- No. No plans to obtain this lab test
- Not sure